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REVIEW ESSAY

TOWARD A NOTION OF ENVIRONMENTAL BIOETHICS

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REVIEW OF ERIC A. DAVIDSON, YOU CAN'T EAT GNP: ECONOMICS AS IF ECOLOGY MATTERED (2000)

On November 7, 2000, while most people in the United States focused on the question of who our next President was going to be, lawyers for the American Trucking Associations and other industry groups argued to the Supreme Court that the Environmental Protection Agency ("EPA") should set the National Ambient Air Quality Standards ("NAAQS") under the Clean Air Act through a cost-benefit analysis.[1] The Clean Air Act requires the EPA to set NAAQS—numeric limitations on the concentrations of various air pollutants, such as particulates or sulfur dioxide—at levels that "protect the public health" and "protect the public welfare from any known or anticipated adverse effects associated with the presence of such air pollutant in the ambient air."[2] Federal courts have upheld the EPA's authority to set NAAQS to ensure that human health is protected, even when the exact harms from a given pollutant are uncertain.[3] Nevertheless, on appeal before the Supreme

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1. Linda Greenhouse, *Attack on Clean Air Act Falters in High Court Arguments*, N.Y. TIMES, Nov. 8, 2000, at A20.

2. 42 U.S.C. § 7409(b)(1)-(2) (1994).

3. *See, e.g.*, Lead Indus. Ass'n v. EPA, 647 F.2d 1130, 1151-53 (D.C. Cir. 1980) (rejecting an industry argument that the EPA can only protect against health effects that are clearly harmful or clearly adverse).

Court, industry lawyers argued that environmental regulation should be a matter of economics.

The industry groups' arguments regarding NAAQS emphasize that the interaction of economics and environmental integrity is the focus of much of the debate over American environmental policy. Unfortunately, popular environmental policy discussion often interprets concerns over ecological integrity as threats to human prosperity. In popular media, for example, news stories pose stark choices to the American people: do we want salmon or cheap power, spotted owls or a thriving timber industry, "surplus" tuna swimming in the sea or employed fishers, interfering governments or strong property rights?

Such presentations are, of course, reductionist. Nevertheless, they highlight a disjunction that currently permeates much of the American debate over environmental policy—namely, that the question of how to value human welfare has come to be perceived as a different question from how to value an increasingly abstract concept of "the environment." Except during the occasional natural disaster, when the immediate connection between "the environment" and everyday human life cannot be ignored, Americans often have the luxury of viewing the natural ecosystems that surround them as something "other," distinct and separate from human existence. We are a nation with many people who spend their lives largely insulated from any direct contact with the environment: water comes from the tap, food comes from the supermarket, sewage "disappears" down a pipe, garbage is hauled "away."[4]

In its early stages, federal environmental law often benefited from headliner problems that made the need for better environmental protections obvious, including cholera outbreaks from untreated sewage dumped into waterways, rivers so polluted that they could catch on fire, smog-filled airsheds that required frequent health alerts, and toxic soups of poorly-disposed chemicals bubbling up into homeowners' basements. In a culture where intimate and frequent contact with natural ecosystems is increasingly rare, however, the impetus for protecting the environment can quickly lose any sense of anthropocentric self-interest. Ironically, the fact that nearly three decades of environmental legislation has in fact re-

4. *See* James Salzman, *Valuing Ecosystem Services*, 24 ECOLOGY L.Q. 887, 888 (1997) ("The general ignorance of ecosystem services is partly the result of modern society's dissociation between computers, cars and clothing on the one hand and biodiversity, nutrient cycling, and pollination on the other.").

duced the frequency with which environmental problems impinge on Americans' daily lives has only served to further obscure the direct connections between humans and environmental protection. Environmentalism in the current American culture runs a real risk of becoming mere altruism—an impulse to protect the environment based on something other than a perception of direct benefit to the protector.

Altruism may be a noble motivation, and there is merit to the idea that nature has its own intrinsic value quite apart from what we humans might do with it. Nevertheless, in the realm of politics and policy, self-interest is a much more reliable basis than altruism for any long-term commitment to sustaining a productive and healthy environment for generations to come. Self-interest can compel people to act in desired ways long after altruism becomes too expensive or inconvenient to maintain.

Not all types of self-interest serve the goals of environmental protection, however. At the other end of the spectrum from altruism, for instance, is the view that the environment is first, last, and foremost a source of raw materials and goods that create private wealth—food, minerals, timber, and so on. From this perspective, the environment is valuable because humans can directly, and often exploitatively, make use of it. Many such uses, moreover, are easily describable through neoclassic economic analyses of supply and demand and market efficiency—the cutting and sale of timber, the catch and sale of fish, the mining and processing and sale of metals.

The problem with this consumer view is that many aspects of the environment get left out of economic calculations and cost-benefit analyses. The American Trucking Associations were well aware of this phenomenon when they suggested cost-benefit calculations as the solution to the NAAQS "problem." The problems that result from ready access to air or water for waste disposal or from denuded or mined lands have traditionally been externalities that no one had to pay for.[5] As a result, decisions that make perfect sense

5. *See* Christine M. Augustyniak, *Economic Valuation of Services Provided by Natural Resources: Putting a Price on the "Priceless,"* 45 BAYLOR L. REV. 389, 389 (1993) ("[F]ailing to attach values to natural resources in a policy framework results in those resources being treated as though they have zero price, i.e., the resources are 'valueless.'"); *see also* Robert Costanza et al., *The Value of the World's Ecosystem Services and Natural Capital*, 387 NATURE 253, 253 (1997) ("Because ecosystem services are not fully 'captured' in commercial markets or adequately quantified in terms comparable with economic services and manufactured capital, they are often given too little weight in policy decisions."); Salzman, *supra* note 4, at 888 ("The primary reason that ecosystem services are taken for granted, however, is that they are free. . . . [T]he ser-

in the terms of pure neoclassical economics can leave air unbreathable, water undrinkable, and landscapes barren and poisoned.

One of the more important developments in the economics of environmental protection has been the rise of *ecological economics*,[6] a discipline that seeks to unify (or perhaps more accurately, reunify) the issues of valuing the environment and valuing the quality of human life. The key concept for ecological economics is *ecosystem services*—those basic life-supporting services that the environment provides, such as "purification of air and water, pest control, renewal of soil fertility, climate regulation, pollination of crops and vegetation, and waste detoxification and decomposition."[7]

By identifying and valuing ecosystem services, ecological economics seeks to force people to recognize their intimate dependency on the environment, including their dependency on distant ecosystems, and to factor that dependency into policy decisions regarding the environment. For example, in one of the more famous decisions based on recognizing the value to humans of ecosystem services, New York City chose to restore the ecological integrity of the Catskill Mountains in order to re-establish a pure supply of drinking water, rather than building a water purification plant. The city's reason for doing so was simple: it was cheaper ($660 million as opposed to $4 billion) to restore the mountain ecosystem than it was to build and maintain a technological substitute for the purification services that an intact ecosystem could provide.[8]

There are other indications that the economics of ecosystem services could be an effective catalyst in re-establishing environmental protection as an intrinsically anthropocentric issue—that is, as not just a matter of saving whales or spotted owls or a few hundred flies in southern California, but as the key to preserving ourselves and future generations of human beings. In a controversial but influential 1997 study, a group of ecological economists esti-

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vices underpinning [ecosystem] goods generally have no market value —not because they are worthless, but rather because there is no market to capture and express their value directly.").

6. Ehsan Masood & Laura Garwin, *Costing the Earth: When Ecology Meets Economics*, 395 NATURE 426, 426-27 (1998).

7. Salzman, *supra* note 4, at 887-88; *see also* Costanza et al., *supra* note 5, at 254 (identifying seventeen ecosystem services, including: gas regulation, climate regulation, disturbance regulation, water regulation, water supply, erosion control and sediment retention, soil formation, nutrient cycling, waste treatment, pollination, biological control, refugia, food production, raw materials, genetic resources, recreation, and cultural services).

8. Salzman, *supra* note 4, at 893-94.

mated that the value of the world's ecosystem services is approximately $33 trillion, or 1.8 times as large as the global GNP.[9] Environmental lawyers, moreover, have been quick to suggest that the concept of valued ecosystem services could bring profound changes in certain aspects of environmental law. Such changes could range from "influenc[ing] the process of natural resource damage assessment under CERCLA, the Oil Pollution Act, and similar federal and state laws" to reformation of "some existing legal regimes [that] pose barriers" to using the ecosystem services concept, including "[w]ater rights, federal land multiple use mandates, below-cost timber sales, [and] tax and subsidy structures."[10]

Against this background, Eric A. Davidson has submitted his own attempt to re-connect Americans to their environment, *You Can't Eat GNP: Economics As If Ecology Mattered* ("*You Can't Eat GNP*").[11] His argument is clearly and openly stated early in the book:

> We may not need to think about tilling the fields every day, but we had better not lose sight of the fact that our wealth and our comfort are derived from a combination of natural resources—soil, water, air, forests, oceans, mineral deposits, climate—and the skill and ingenuity with which we utilize and manage those resources. If we neglect or abuse those natural resources, we undermine our own prosperity.[12]

Davidson begins his exposition on this subject by identifying three fallacies of neoclassical economics: "Marie Antoinette economics,"[13] "Custer's folly,"[14] and "false complacency from partial success."[15] The fallacy of Marie Antoinette economics arises when

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9. Costanza et al., *supra* note 5, at 259. By changing some beginning assumptions, the researchers calculated the range of possible values for the world's ecosystem services to be $16 to $54 trillion. *Id.*

10. J. B. Ruhl, *Valuing Nature's Services: The Future of Environmental Law*, 13 NAT. RESOURCES & ENV'T 359, 361 (1998); *see also* Salzman, *supra* note 4, at 898-903 (outlining how the concept of ecosystem services could offer environmental law "specificity of indicators" that environmental harm has occurred, increasing potential causes of action; "specificity of causation" as to the source(s) of environmental harm, influencing environmental standing and Commerce Clause challenges; and a "persuasive argument that biodiversity and habitat protection provide important benefits in ways not normally considered").

11. ERIC A. DAVIDSON, YOU CAN'T EAT GNP: ECONOMICS AS IF ECOLOGY MATTERED (2000).

12. *Id.* at 6.

13. *Id.* at 7.

14. *Id.* at 8.

15. *Id.* at 11.

economists treat various segments of the GNP as interchangeable, like the economist who considered global warming an insignificant problem because it would affect only agriculture, which makes up a mere 3% of the nation's GNP.[16] Davidson's point is that when crops fail, people go hungry, regardless of whether the other 97% of the GNP is unaffected.[17] And it probably *won't* be unaffected, because "the economic system will fail if the ecological system is not carefully managed. The inverse, which is also true, is that a failed economic system creates desperate people who will destroy the ecological system."[18]

The fallacy of Custer's folly is the belief that new and better technology, like the cavalry, will always save us from ecological disaster.[19] While Davidson welcomes any helpful technology that comes along, he also advises prudence and caution in our use of our environment:

> [W]e had best not rely solely on future technological developments to clean up the messes that we are now making with our current bad habits. Prudence dictates that we slow population growth, prevent soil erosion, conserve groundwater, and stop polluting the atmosphere. Future generations will benefit from these essential natural resources under any scenario of technological development.[20]

The fallacy of false complacency arises from the successes that environmental law has already secured, and Davidson's point is that some progress in cleaning up our air and water should not prompt us to think that we have taken care of our environmental problems:

> A bit of progress is no reason for complacency in a world where forests are being converted to ranches, farms, and abandoned land at an astounding rate, where the genetic diversity of plants and animals is declining and species are going extinct at unprecedented speed, where fisheries are collapsing, where soil is eroding faster than it can be regenerated, where heat-trapping gases are accumulating in the atmosphere, and where groundwater is becoming depleted and contaminated.[21]

As the title of Davidson's book indicates, he is interested in

16. *Id.* at 7.
17. *Id.*
18. *Id.* at 8.
19. *Id.*
20. *Id.* at 9.
21. *Id.* at 11.

food, or, more broadly, basic survival. His view of ecological economics, therefore, appropriately starts with the soil. Farming throughout the world, as Davidson describes it, has long been a process of exposing and depleting fertile topsoils, then abandoning those lands for new ones, leaving the used-up soils to erode under the forces of water and wind.[22] Davidson focuses on cotton farming, a notoriously soil-destructive crop,[23] but the reader can also recall the Great Dust Bowl of the 1930s to support Davidson's picture. Davidson then contrasts the neoclassical economist's and the ecologist's views of such farming practices:

> Economists would argue that these farmers were acting rationally in terms of doing what provided them the greatest profit for their investments of capital and labor. Ecologists, on the other hand, see a sad, irrational legacy of abuse of the land by previous generations, which limits the potential use of the land today and for several generations to come.[24]

Indeed, Davidson stresses, humans' continued survival at present population levels has depended heavily on technological advances in agriculture, such as chemical fertilizers and pesticides, rather than on our stewardship of naturally fertile soils.[25] But we must resist the temptation to take good soils for granted and to fall into Custer's folly regarding further technological advances, because:

> Soil is more than dirt. It is a complex mixture of minerals and organic matter that can provide a rich medium for abundant plant growth. It takes a long time, however, for Mother Nature to make good, fertile topsoil. Dead leaves and roots are gradually mixed with the clay minerals by the activity of worms, mites, bacteria, and other organisms living in the soil. This mixture has the right combination of nutrients, aeration, and water-holding properties to nourish the plants. When the topsoil is eroded away, exposing the deeper subsoil layers that have not developed this rich mixture of organic matter with minerals, abundant plant growth cannot be supported. Depending on the climate and the type of vegetation, the formation of an inch of new topsoil can require anywhere from fifty years to several hundred years.[26]

A number of Davidson's more general themes emerge as he discusses soil. First, Davidson stresses throughout his arguments

22. *Id.* at 16.
23. *Id.* at 15-17.
24. *Id.* at 17.
25. *Id.* at 18.
26. *Id.* at 23-24.

that when humans use environmental natural capital without an ecological perspective, they often cause other environmental problems that are far more difficult and expensive to solve.[27] For example, the chemical fertilizers and pesticides that preserve and enhance soil productivity pollute surface and groundwater.[28] Nevertheless, under neoclassical economics, the farmer's decision to apply excess fertilizers and pesticides to crops makes perfect sense even though the farmer knows that some will be washed away, because the cost of polluting the water is an externality for which the farmer pays nothing.[29]

But what about the Clean Water Act?,[30] the reader may wonder. While it is true that environmental regulation can force polluters to think about externalities that would otherwise be "free" and force them, in some sense, to "pay" for their pollution through permit requirements and fees, Davidson's farming example is a particularly apt choice to demonstrate the gaps in current American environmental law. Farmers enjoy several exemptions from environmental mandates that might otherwise force them to take account of the costs of pollution.[31] For example, farmers are not forced to comply with the federal Clean Water Act's general requirement that persons discharging pollutants into waterways have a permit.[32] Rather than being regulated, therefore:

> The fertilizer that makes crops grow better while still on the farmer's field also makes unwanted algae grow better in streams and lakes, which chokes out the native aquatic plants, depletes oxygen in the water that the fish need, and destroys the natural food chain. Some of the fertilizer and pesticide also make their way into the groundwater, which is out of sight but a vital source of drinking water and irrigation water in many regions of the world.[33]

As a result, the local problem of how one farmer grows the largest

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27. *Id.* at 121-24.

28. *Id.* at 124-29.

29. *See id.* at 122.

30. Federal Water Pollution Control (Clean Water) Act, 33 U.S.C. §§ 1251-1376 (1994).

31. For a discussion of the numerous exemptions from environmental regulation that farms and farmers enjoy, see generally J. B. Ruhl, *Farms, Their Environmental Harms, and Environmental Law*, 27 ECOLOGY L.Q. 263, 293-327 (2000).

32. *See* 33 U.S.C. § 1311(a) (making it illegal for any person to discharge a pollutant into a navigable water except in compliance with the federal Clean Water Act); § 1342(e)(1) (allowing an exception for the discharge of agricultural pollutants).

33. DAVIDSON, *supra* note 11, at 122-23.

crop possible becomes a regional problem of water pollution, and, as Davidson points out, "[l]ocal problems are almost always easier to solve than are regional ones."[34] Groundwater in particular can take several hundred or even thousands of years to flush out and recharge naturally.[35]

The lengths of time involved in soil regeneration and groundwater replenishment underscore Davidson's second theme: a long-term, multi-generational view of ecology and economics that defines "success" not by quarterly or yearly profits but by the sustainability of ecosystem services and the quality of the planet left to the next several generations of humans. Davidson criticizes short-term thinking throughout his analysis, while still recognizing that most people can and will yield to the temptation to ignore the needs of future generations. Thus, "we know that protecting natural resources for the benefit of future generations is the right thing to do, but we often yield to the temptation of ignoring the well-being of future generations for the sake of more consumption in the short-term."[36] This regard for future generations is a hallmark of ecological economics, which "aims to provide a framework for the equitable distribution of resources and property rights within the present generation of humans, between current and future generations and between humans and other species."[37]

The structure of this framework, and the related criticism of current economics, policy, and law, is the third and most important theme in *You Can't Eat GNP*. In the case of soils, for example, Davidson recognizes that:

> The problem is not that we are dumb—we understand why the soil becomes degraded and how to avoid it—but that collectively we are forgetful, some of us are greedy, and some are desperate. And there is no shortage of inept managers and policymakers ready to condone and implement practices based on greed and desperation.[38]

He criticizes current policies, such as subsidies for irrigation water, that encourage environmentally-damaging practices, and lauds those, like the Conservation Reserve Program, which encourages farmers to conserve easily-erodible land, that encourage long-term

34. *Id.* at 123.
35. *Id.* at 125.
36. *Id.* at 69.
37. Masood & Garwin, *supra* note 6, at 427.
38. DAVIDSON, *supra* note 11, at 31.

ecological sustainability. Nevertheless, Davidson has a much larger goal in mind than retooling individual regulatory programs. He wants "an economic system that is designed to value the future at least as much as the present."[39]

You Can't Eat GNP pursues this ultimate goal in primarily two ways: (1) by attacking cost-benefit analyses as they are currently performed in environmental law and policy; and (2) by suggesting steps that Americans can take to implement sustainable policies of ecological economics. Davidson devotes two of his nine chapters to cost-benefit analyses, emphasizing that "many of the benefits of environmental protection are left out of the balance sheet entirely because they are too difficult or impossible to calculate by standard neoclassical economics."[40] In particular, Davidson highlights two problems with cost-benefit analyses based on principles from neoclassical economics: valuation at the margin and discounting to present value.

Marginal valuation relies on the prices for limited numbers of goods or services traded on the open market in accordance with the law of supply and demand. As a result, it both fractionalizes the potential value of functional ecosystems and ignores those services for which ready markets do not exist. Marginal valuation thus results in cost-benefit analyses that do not fully account for the value in leaving ecosystems intact and undamaged, creating a bias toward using and exploiting the environment. By increasing the value placed on intact ecosystems, the concept of ecosystem services could, Davidson admits, legitimize some cost-benefit analyses for environmental decision-making, "as long as the inadequacies of the monetary estimates of ecosystem services are recognized."[41] When policymakers recognize that ecosystem services exist and have monetary value, they should be less likely to favor choices that impair those ecosystems.

Nevertheless, even ecosystem services suffer from pricing at the margin, and "[t]he value to humanity of the many products and services provided by [the environment] may be greater than the sum of the many small parts calculated at the margin."[42] As a result, Davidson remains skeptical of environmental cost-benefit analyses, *even if* ecosystem services become a standard part of the

39. *Id.* at 77.
40. *Id.* at 39.
41. *Id.* at 48.
42. *Id.* at 56.

balancing equation. "The right prices for ecosystem services, and the marginal valuation method upon which these are based, are useful tools for many inevitable decisions about trade-offs, but they may be inadequate to conserve the natural resources that we will need at large scales for long-term economic and ecological prosperity."[43] Instead, our economic and political systems have to recognize and account for the fact that certain resources such as "soil, fresh water, air, forests, and oceans . . . are essential, irreplaceable, and nonsubstitutable"[44]—"that the economic system cannot exist without the ecological system."[45]

If valuation at the margin undervalues intact ecosystems and natural capital, then discounting in cost-benefit analyses favors present use over long-term sustainability. Discounting is the process of calculating the present value of an economic decision, allowing ready comparison of various options. In Davidson's example, a logging company might be deciding whether to cut a stand of timber this year or wait until next year. This year, the trees are worth $1000, which the company could then invest for a year and earn 8% interest, giving the company a total profit a year from now of $1080. Alternatively, the company could wait a year to cut the trees, which would then be worth $1050 because they were slightly bigger. The company would, however, have lost out on the interest for a year, and thus the trees are actually worth more if cut now rather than later. Discounting to present value, again assuming an 8% return rate, the timber is worth $1000 now if cut and $969 now if left standing.

So far, this is all standard economics. Davidson, however, challenges the whole notion of discounting, arguing that "[a]ny parent or grandparent knows that there is something wrong with this notion that the future is worth less than the present."[46] What discounting ignores is the interim and future value of the intact ecosystem. For instance, in the timber example, discounting completely leaves out the value of having standing trees and the services they provide (erosion control, gas exchange, root habitat) for an additional year, plus the value of still having the option to cut or not cut a year from now. While Davidson acknowledges that one problem may be the choice of discount rate—lower discount rates

43. *Id.* at 58.
44. *Id.* at 55.
45. *Id.* at 59.
46. *Id.* at 68.

tend to encourage people to leave the environment intact, while higher discount rates encourage immediate use and exploitation—he more strongly argues that the present generation needs to act according to the precautionary principle. That is, the current generation needs to be willing to accept the current costs of environmental protection to shield their children and grandchildren from higher costs and, perhaps, irreversible destruction. By doing nothing now, we are in fact choosing to risk imposing the future costs of "soil erosion, global warming, groundwater pollution, and vast destruction of forest habitat"[47] on future generations, betting *their* future on the hope that some unknown and uninvented *something* will come along that makes solving those environmental problems cheaper and easier. In other words, we are falling victim to Custer's folly and forcing others to pay for it.

Davidson also points out that we are ignoring the fact that leaving intact and functional ecosystems to future generations also has value, both economic and moral:

> Instead of starting with a vision of the world we want to leave to future generations and then allowing economics to help us find the most efficient way to achieve that goal, we are letting the economic tail wag the dog by misusing the tools of economics to define the goals.[48]

Neoclassical economic theory cannot make the social and moral decisions regarding the proper distribution of wealth and property within the existing generation nor among the generations, and "[w]e should not expect neoclassical economic theory to tell us how much of our natural resource wealth we *should* leave intact for the use of future generations."[49] Davidson offers no magic solution, however, except a vision of the decision-making process: "[w]e must weave together our instinctive parental precaution with transparent economic analyses as we make decisions that affect the environmental inheritance passed on to the next generation."[50]

Davidson does, however, offer a series of practical steps for both governments (the top-down approach) and individuals (the bottom-up approach) to take to begin to achieve his vision of ecological economics. Somewhat surprisingly, given his topic, population growth and population control become real topics only in the

47. *Id.* at 74.
48. *Id.*
49. *Id.* at 76.
50. *Id.* at 79.

last chapter, when Davidson suddenly reveals them to be the foundation of his structure of environmental economics. In particular, Davidson advocates *not* filling the planet to capacity with human beings:

> [H]ow many people the earth can support is the wrong question to be asking. Rather, we should be asking if we already have enough people and perhaps too many people. If the neoclassical economic model is right—that each additional person is a valuable worker, consumer, contributor to the GNP, and stimulator of innovative technologies that can substitute for all natural resources—then we have nothing to worry about as the population grows. If the second law of technodynamics is correct—that the increasingly difficult challenges of consuming nonsubstitutable resources, providing food, and disposing of garbage for a rapidly expanding population leaves us and future generations with fewer options and more problems to resolve—then we already have too many people on the earth.[51]

One of Davidson's eight "top-down" recommendations, therefore, is that countries with income taxes should eliminate tax deductions for more than two children.[52] He also recommends that countries should stop building new roads, because "[t]ruly sustainable development that will bring large numbers of people out of poverty will require intelligent intensification of agricultural and industrial productivity in the areas already accessible by existing roads."[53] In addition, Davidson suggests that taxes on income be reduced while taxes on consumption are increased; that governments eliminate subsidies that encourage wasteful and destructive use of water and public lands; that farmers be encouraged to make more efficient use of their land, to prevent soil erosion, and to minimize use of fertilizers and pesticides; and that governments eliminate subsidies for industrial fishing.[54] Finally, he recommends that countries ratify the Kyoto Agreement to reduce greenhouse emissions, and that countries negotiate international agreements to maintain forest cover and to manage forests "to maximize genetic diversity of plants and animals."[55]

Davidson's "bottom-up" recommendations stress personal responsibility for the environment and the policy decisions that are

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51. *Id.* at 188.
52. *Id.* at 198.
53. *Id.* at 197-98.
54. *Id.* at 198-200.
55. *Id.* at 200.

made regarding its use. He suggests, for example, that readers educate others by lending *You Can't Eat GNP* to persons who would not otherwise read it[56] and by ensuring that their legislators understand the importance and value of intact ecosystems. Davidson also encourages readers to analyze and change their own consumption habits and to work toward changing "the way our society currently values and uses our resources."[57]

In the end, however, Davidson is content with making a modest beginning in changing his readers' perceptions of their connection to the environment. Despite his potentially revolutionary goal of a whole new economic structure, he admits in the end that "[c]hanging a way of thinking as deeply entrenched as neoclassical economics appears daunting, and I cannot put my finger on exactly how it will come about. Persistent, pervasive, and popular pressure will surely be a part of it."[58] The law, too, could certainly have a role. Davidson recognizes this most clearly in his "top-down" recommendations, many of which, such as the elimination of various government subsidies and various tax reforms, could have profound ramifications for American environmental policy and politics.

Davidson, however, is a scientist, not a lawyer, and his book leaves largely unexplored the full and creative potential for law to help bring about the "sea change" in thought that he seeks. In particular, Davidson's goals for ecological economics cry out for laws and policies that make humans' connections to their environment protectable and enforceable. Other writers have already suggested the concept of an "eco-tort" as one means of incorporating the concept of ecosystem services into environmental law. Such suggestions, however, often begin with an expanded concept of private property—as J. B. Ruhl has described it, "a new form of tort, an eco-tort, to capture damage to one's ecosystem service *ownership*."[59]

Another form of eco-tort is possible, however—one rooted in a bioethical conception of personal integrity and autonomy rather than in property rights. In medicine, the law has effectively protected the integrity and personal autonomy of patients through doctrines such as informed consent, the patient's right to refuse treatment, and physician nonmalfeasance. Moreover, the law of

56. *Id.* at 202.
57. *Id.* at 209.
58. *Id.* at 216.
59. Ruhl, *supra* note 10, at 361 (emphasis added).

medical bioethics has accomplished such protection while operating under two serious constraints. First, American law is unwilling (indeed, is constitutionally unable) to recognize a *property* right in a person's own body. Basic property rights, after all, almost always include the right to sell, transfer, damage, and destroy the property involved. If applied to human beings, these rights would legalize slavery and murder. Second, principles of medical bioethics also recognize, implicitly and explicitly, that one person's rights of autonomy and self-integrity are limited: (1) by other individuals' claims to similar rights, demonstrated most graphically through the ongoing debates regarding the status of a fetus and the recognition of the so-called maternal-fetal conflict; (2) by certain kinds of medical necessity, as when doctors treat unconscious or otherwise incompetent patients; (3) by generally-accepted norms of medical ethics, as the strong resistance to legalized euthanasia and physician-assisted suicide continue to emphasize; and (4) by the needs of the greater community, as when involuntary quarantine becomes a legitimate infringement of individual autonomy during outbreaks of highly communicable diseases.

What if the concepts of personal integrity and autonomy were expanded to include those ecosystem services upon which a person's life depends? If the ultimate environmental goal is, as Davidson argues, to recognize humanity's intimate dependence on intact and sustainable ecosystems and to create political and economic systems that strongly value protecting those ecosystems and their services through multiple generations, then a non-property-based legal regime offers environmental law the same balanced advantages that it does to medical bioethics. Ecological integrity can be legally protected without converting ecosystem services into privately-owned, and therefore transferable and destructible, commodities. Environmental bioethics would thus protect the environment without giving individuals the power to interfere with other individuals' and the larger community's dependence on, and rights regarding, those same ecosystems. In addition, a legal regime of environmental bioethics would rescue the concept of human connectedness to the environment from the quasi-religious overtones it acquired in the 1960s and 1970s, stressing that environmental damage is about real human injury and real human survival, not some mystical "oneness with the universe."

Eco-torts based on a notion of environmental bioethics would, in effect, recognize an expanded concept of legal "personhood," one that includes the environmental systems necessary to support a

human life. As such, bioethical eco-torts are a fairly radical legal concept, and implementing them would require courts and legislatures to accept a very different definition of what it means to be a human being than that which currently exists in the law. Nevertheless, it is worth noting that tort law already does extend personal injury beyond the bounds of a person's own skin, as in wrongful death and loss of consortium claims. Moreover, as a practical matter, most eco-torts would probably result in class-action litigation, because the chances are great that ecosystem damage, unlike medical decisions, would affect far more than one person at a time. Finally, bioethical eco-torts would probably also require courts and legislatures to adjust standard legal principles of standing (strongly implying that bioethical eco-torts should be state law causes of action, not federal) and causation.

On the other hand, if the goal truly is to bring about a "sea change" in Americans' conception of the environment, to convince them that intact ecosystems and ecosystem services have sufficient value to counter the short-term profits from exploitative and unsustainable use, we could do worse than creating a new legal cause of action that forces people to conceptualize the environment as part of themselves instead of something "other." The existence of bioethical eco-torts would encourage every individual to learn about and keep watch over the environmental processes upon which that individual's quality of life depends, whether those processes be the water purification processes in the Catskill watershed or the natural soil regeneration processes that created this country's farmlands. The identification of environmental damage with personal injury rather than property damage could thus effectively repair the disjunction between the value we place on the economic quality of human life and the value we place (or don't place) on "the environment" in the abstract.

What Davidson and ecological economists really seek to teach us, as I have presented them, is that we are intimately, personally, and directly dependent on our environment and the life-sustaining services it provides. But if the popular conception of the environment is going to change, people need a pro-ecosystem mental image strong enough to withstand the repeated assaults of personal desire and greed. A legally-enforceable notion of environmental bioethics that recognized our absolute dependence on intact and functional ecosystems could not only legally protect ecosystems and their services but also re-figure our short-sighted GNP-producing consumerism into a morally repugnant, and legally expensive,

environmental cannibalism. After all, the point is not so much that we cannnot eat GNP, but rather that we should not eat ourselves—or our children.